



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/444,460~	11/22/1999	HIDEAKI FUJITA	1248-0472P-S	8686

7590 07/31/2003
BIRCH STEWART KOLASCH & BIRCH LLP
P O BOX 747
FALLS CHURCH, VA 220400747

EXAMINER

KNAUSS, SCOTT A

ART UNIT PAPER NUMBER

2874

DATE MAILED: 07/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/444,460

Applicant(s)

FUJITA ET AL.

Examiner

Scott A Knauss

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,7,9,11,13,15,17,19-32,37-46 and 51-57 is/are pending in the application.

4a) Of the above claim(s) 19-32 and 37-40 is/are withdrawn from consideration.

- 5) ☒ Claim(s) 15 and 17 is/are allowed.
- 6) ☒ Claim(s) 1,3,5,7,9,11,13,41-46 and 51-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/19/02 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

1. The applicant's amendment filed 5/27/03 has been entered and been carefully considered by the examiner. However, the arguments provided in the response are not deemed convincing in view of the remarks presented in this office action. Therefore, the rejection is made final.

Election/Restrictions

2. Claims 19-32 and 37-40 were previously withdrawn by the examiner as being drawn to a nonelected invention. All non-elected claims must be canceled prior to allowance of the application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

Art Unit: 2874

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1,3,7,9,11,41-46 and 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,497,445 (Imoto) in view of US 4,464,762 (Furuya) and US 5,850,498 (Shacklette et al.)

Regarding claims 1,7,9, 41-46 and 57, Imoto discloses in fig. 6g an optical waveguide including a substrate made of silicon (column 5, lines 27-30), a buffer layer (#6) over the substrate, a core section (#3) made of polyimide (an organic polymer) (column 7, lines 44-47), and a clad section (#10) covering an upper surface of the core section made of an inorganic dielectric having a lower refractive index than that of the core section (see abstract, column 7, lines 21-24).

Although Imoto discloses the use of a silicon oxide compound as a cladding, it does not disclose the use of a cladding *consisting essentially* of silicon oxide. Imoto does, however disclose the use of SiO₂ as a secondary cladding (see column 6, lines 46-48)

Furuya, on the other hand, discloses in fig. 2, column 5, lines 1-6, column 8, lines 29-35, and column 10, lines 35-40 the use of upper (#21) and lower (#23,#25) cladding layers formed of silicon oxide (both SiO and SiO₂) around cores (#22,#24) of polyimide. Such an arrangement is desirable to produce a refractive index distribution suitable for conducting optical signals, and has a simpler chemical composition than the silicon oxide compound used by Imoto.

Therefore it would have been obvious to one of ordinary skill in the art to use a silicon oxide compound as the buffer and upper cladding layers of Imoto in order to provide a refractive index distribution suitable for conducting an optical signal, while having a simple chemical composition that is easy to produce.

Imoto also fails to disclose the use of a cladding having a conformal shape. Nevertheless, claddings having such shape are well known in the art. Shacklette discloses an example of such a configuration in fig. 1, wherein a core (#1) is surrounded by a conformal cladding (#11). Such a configuration is advantageous because it enables the waveguide to be easily aligned with a second waveguide assembly (see column 4, lines 38 - 64).

Therefore it would have been obvious to further modify the waveguide disclosed by Imoto to use a conformal cladding as taught by Shacklette to facilitate alignment of the waveguide with a second waveguide or fiber.

Regarding claims 41-46 and 57 applicant is claiming the product including the process of making an optical waveguide, and therefore are of "product-by-process" nature. The courts have been holding for quite some time that: the determination of the patentability of product-process claim is based on the product itself rather than on the process by which the product is made. *In re Thrope*, 777 F. 2d 695, 227 USPQ 964 (Fed. Cir. 1985/); and patentability of a claim to a product does not rest merely on a difference in the method by which that product is made. Rather, it is the product itself which must be new and unobvious. Applicant has chosen to claim the invention in the product form. Thus, a prior art product which possesses the claimed product

Art Unit: 2874

characteristics can anticipate or render obvious the claimed subject matter regardless of the manner in which it is fabricated. A rejection based on 35 U.S.C. section 102 or alternatively on 35 U.S.C. section 103 of the status is eminently fair and acceptable. In re Brown and Saffer, 173 USPQ 685 and 688; In re Pilkington, 162 USPQ 147.

As such, no weight is given to the process steps recited in claims 41-46, and 57. Since the waveguide of Imoto, as modified, discloses all the structural limitations of the claims, the claims are therefore rejected in view of Imoto as modified.

Regarding claim 3, Imoto discloses a clad section (#10) which serves as a mask when processing the core section (see column 7, lines 19-21, 32-36).

Regarding claim 11, Imoto since does not specify the use of silane, the examiner assumes that the polyimide used is a polyimide containing no silane.

Claims 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imoto as modified by Furuya and Shacklette et al.

Regarding claims 55 and 56, Imoto, as modified discloses the use of a conformal clad layer (#10) having substantially the same shape as the core of a waveguide. Imoto does not, however, specify the thickness of the layer, in particular a thickness of several microns or 2 microns. Nevertheless, it would have been an obvious matter of design choice to use such thicknesses, since such a modification would have involved a mere change in the size of a component. A change of size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Art Unit: 2874

6. Claims 52-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imoto as modified by Furuya and Shacklette et al. in view of U.S. Patent No. 6,112,002 to Tabuchi.

Regarding claims 52 and 54 Imoto, as modified, discloses an optical waveguide with all the limitations set forth in claim 52 as stated above regarding claim 1, including a buffer layer, organic core, and an inorganic, silicon oxide, conformal cladding and masking clad section (claim 54) but does not disclose an optical element and a waveguide formed on a single substrate. Nevertheless, such a configuration is well known in the art. Tabuchi, in particular discloses in fig. 10 a waveguide (#300) and optical element (#200) placed on a common substrate (#100) for the purpose of efficiently coupling light between the optical waveguide and optical element.

Therefore it would have been obvious to one of ordinary skill in the art to place the optical waveguide of Imoto on a common substrate with an optical element for the purpose of efficiently coupling light between the element and the waveguide.

Regarding claim 53, the claim is of a "product by process" nature, and thus, as stated above, the method by which the optical part is formed does not carry patentable weight, and the claim is therefore rejected as being obvious over Imoto as modified.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imoto as modified by Furuya and Shacklette et al. and further in view of U.S. Patent No. 5,235,663 to Thomas.

Art Unit: 2874

Imoto, as modified above discloses an organic waveguide with all the limitations set forth in the claim 1, but fails to specify surrounding a core and clad section with a light shielding film

Thomas, on the other hand, discloses surrounding a core and clad layer with an opaque jacket comprising a metal film (see column 5, lines 37-42). Such a jacket would be desirable for the purpose of blocking external light from entering the core of a waveguide.

Therefore it would have been obvious to one of ordinary skill in the art to modify the organic waveguide of Imoto by surrounding the core and clad with a light shielding film as taught by Thomas for the purpose of blocking external light from entering the core of an optical waveguide.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imoto as modified by Furuya and Shacklette et al. and further in view of U.S. Patent No. 5,572,619 to Maruo et al.

Regarding claim 13, Imoto discloses an optical waveguide with all the limitations set forth in the claims, including a polyimide core, but does not disclose a core using fluorinated polyimide.

Maruo, on the other hand, discloses an optical waveguide very similar to the waveguide taught by Imoto in figure 1, using a core layer of fluorinated polyimide (column 1, lines 53-67) for the purpose of providing a controllable refractive index and a core with excellent transparency.

Therefore it would have been obvious to one of ordinary skill in the art to replace the organic core taught by Yamamoto with the polyimide core taught by Maruo to provide a waveguide with a controllable refractive index core with excellent transparency.

Allowable Subject Matter

9. Claims 15 and 17 are allowed. The prior art fails to suggest further modifying the device of Imoto, as modified by Furuya and Shacklette, to have an adhesive layer between the core and conformal cladding to improve adhesion between the core and clad section. Maruo, in particular, fails to teach or suggest placing a adhesive layer between an organic core and a conformal silicon oxide clad surrounding the core.

Response to Arguments

10. Regarding claims 1 and 52 the applicant's has set forth the following arguments, which are answered by the examiner as follows:

Regarding the applicant's argument that "the utilization of silicon oxide of Furuya is more highly restricted than the inorganic dielectric made of silicon oxide having a lower refractive index than that of the core section" (page 4, response) it is unclear what the applicant is trying to say, as Furuya does indeed disclose the cladding material having a lower index than the core (col 7, lines 57-65) so it is unclear how the utilization is more restricted. Furthermore, the examiner submits that merely modifying Imoto to use SiO claddings as taught by Furuya would have been obvious to one of ordinary skill in the art to provide a simplified manufacturing process in the waveguide guide of Imoto.

Regarding the applicant's argument that Shacklette uses a polymeric core and

Art Unit: 2874

cladding, with no inorganic material, and that it is impossible to adopt a sputtering method or CVD method to form a clad layer (page 5, response), the examiner submits that Shacklette is merely used in the rejection to show that claddings have such a shape are known in the art to facilitate alignment of the waveguide with a second waveguide or fiber (Shacklette, see above), and the examiner submits that merely changing the shape of the cladding to another known configuration amounts to a mere change in form, which the courts have held is not enough for patentability (In re Dailey 149 USPQ 47).

As to the applicant's argument regarding the use of sputtering or CVD, the applicant is trying to argue process limitations in a product claim, which, as set forth above, the courts have held that the process carries no patentable weight in a product claim.

Regarding the applicant's argument that a thin clad layer does not ensure sufficient adherence between the core and clad, and that both Imoto and Furuya adopt an arrangement in which the core is buried as a result (response, pages 5-6), the examiner finds no suggestion in either Furuya or Imoto that a conformal shaped cladding would not adhere to the core leading to delamination, and finds no reason to believe that such a result would make the mere change in shape of the cladding nonobvious.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2874

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A Knauss whose telephone number is (703) 305-5043. The examiner can normally be reached on 9-6 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (703) 308 - 4819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Scott Knauss

Art Unit 2874


HEMANG SANGHAVI
PRIMARY EXAMINER

Application/Control Number: 09/444,460

Page 11

Art Unit: 2874

sak

July 28, 2003